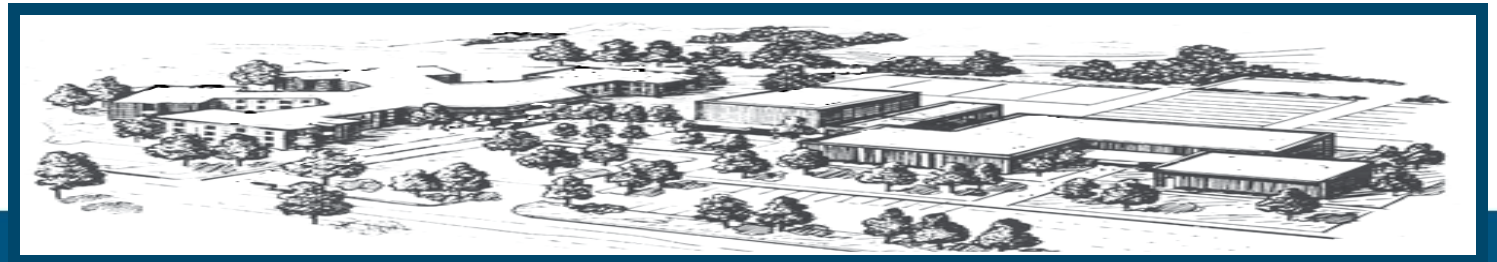
TRC Investigation/Remediation Status
New Bedford High School Vent Remediation
Keith Middle School Air Monitoring

City of New Bedford
Department of Environmental Stewardship



April 30, 2008

WWW.TRCSOLUTIONS.COM

THE SCIENCE COLLABORATIVE
NORTH SHORE

Agenda

❑ Vent Remediation Status at New Bedford High School (NBHS)	D. Sullivan, LSP, CHMM
❑ TRC Investigation/Remediation Status	D. Sullivan, LSP, CHMM
❑ TRC Air Monitoring at Keith Middle School (KMS)	D. Sullivan, LSP, CHMM
❑ Questions & Answers	D. Sullivan, LSP, CHMM D. Vorhees, Sc.D.

NBHS Interior

Remediation Status

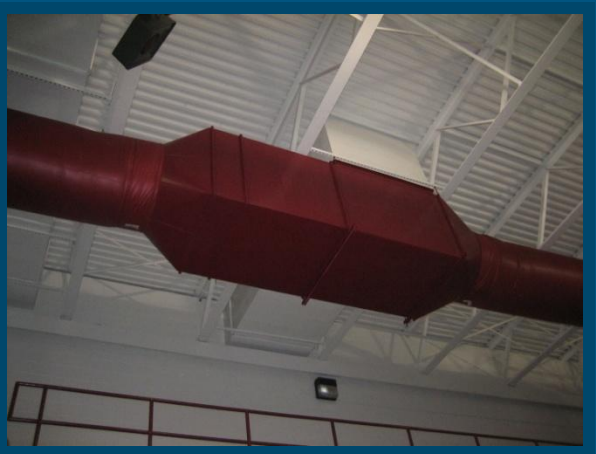
- Remediation Initiated – July 2007
- Remediation Completed – August 2007
- HVAC Repairs/Balance – February 2008
- PCB Air Sampling – February 2008

PCBs > Indoor Air Action Levels

Notes on Process

Response	*Status*
Visual Inspection (sources)	**Done**
Re-sampling	**Done**
Verbal Report to School/City	**Done**
Interviews with personnel	**Done**
Consultation with laboratory	**Done**
Supplemental Assessment Plan	*Submitted to City*

Accomplishments



✓ All Ducts	Cleaned*
✓ 20 HVAC Units	Cleaned
✓ 250 Univent Heaters	Cleaned
✓ 4000 Locker Bottoms	Cleaned
✓ All HVAC Filters	Replaced

*Unless New

Accomplishments (cont.)

- ❑ All fixed horizontal surfaces over eight feet (except newly painted).
- ❑ 207 Wipe Samples - 3 detections all below stds.
- ❑ Significant interior PCB burden reduction.
- ❑ Removal completed on schedule.
- ❑ Air monitoring conducted following remediation (removal) and HVAC balancing.

Hallway Heating Unit and Ventilation System

BEFORE

AFTER

Discoveries

- 20 out of 120 Roof Top Exhaust Vents not working.
- Over 40% of perimeter univents not working.
- Contributed to mixed results from 2007 post-remedial air monitoring.

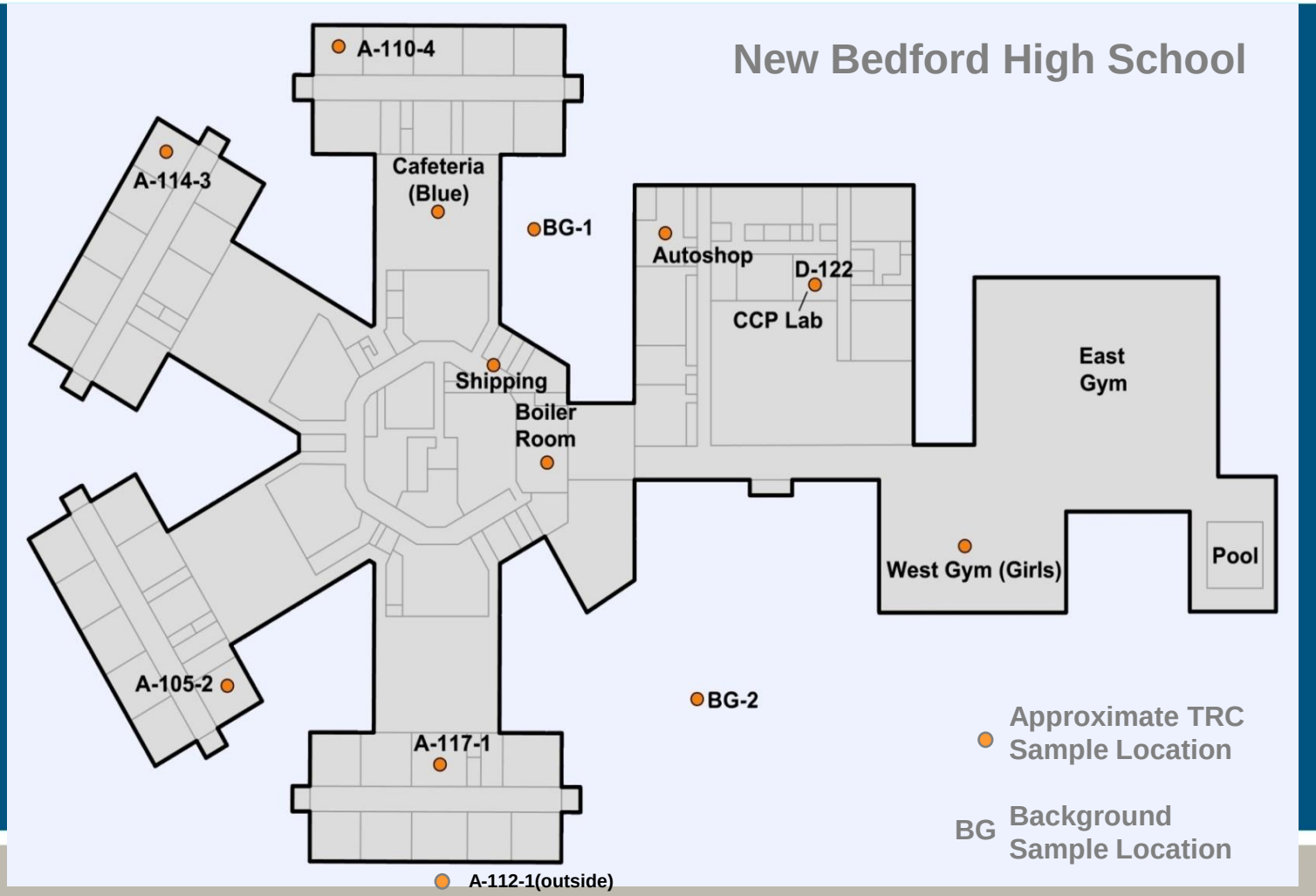
HVAC Status

Air Handling System Repairs

- ❑ Roof top exhaust fans replaced and operational
- ❑ Unit ventilators restored to working order
- ❑ Air handling system balanced

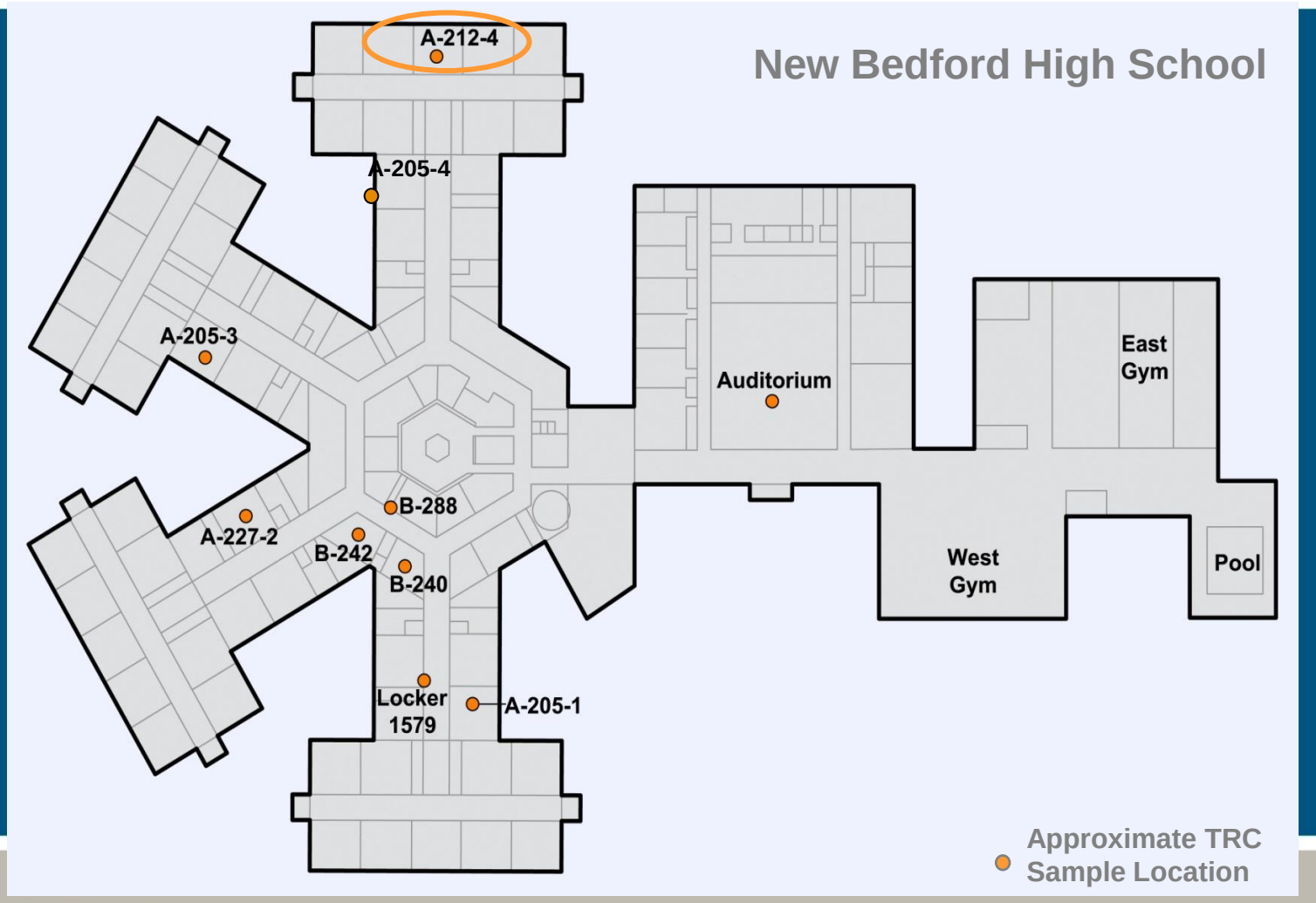
First Floor Air Sampling Locations

February 2008



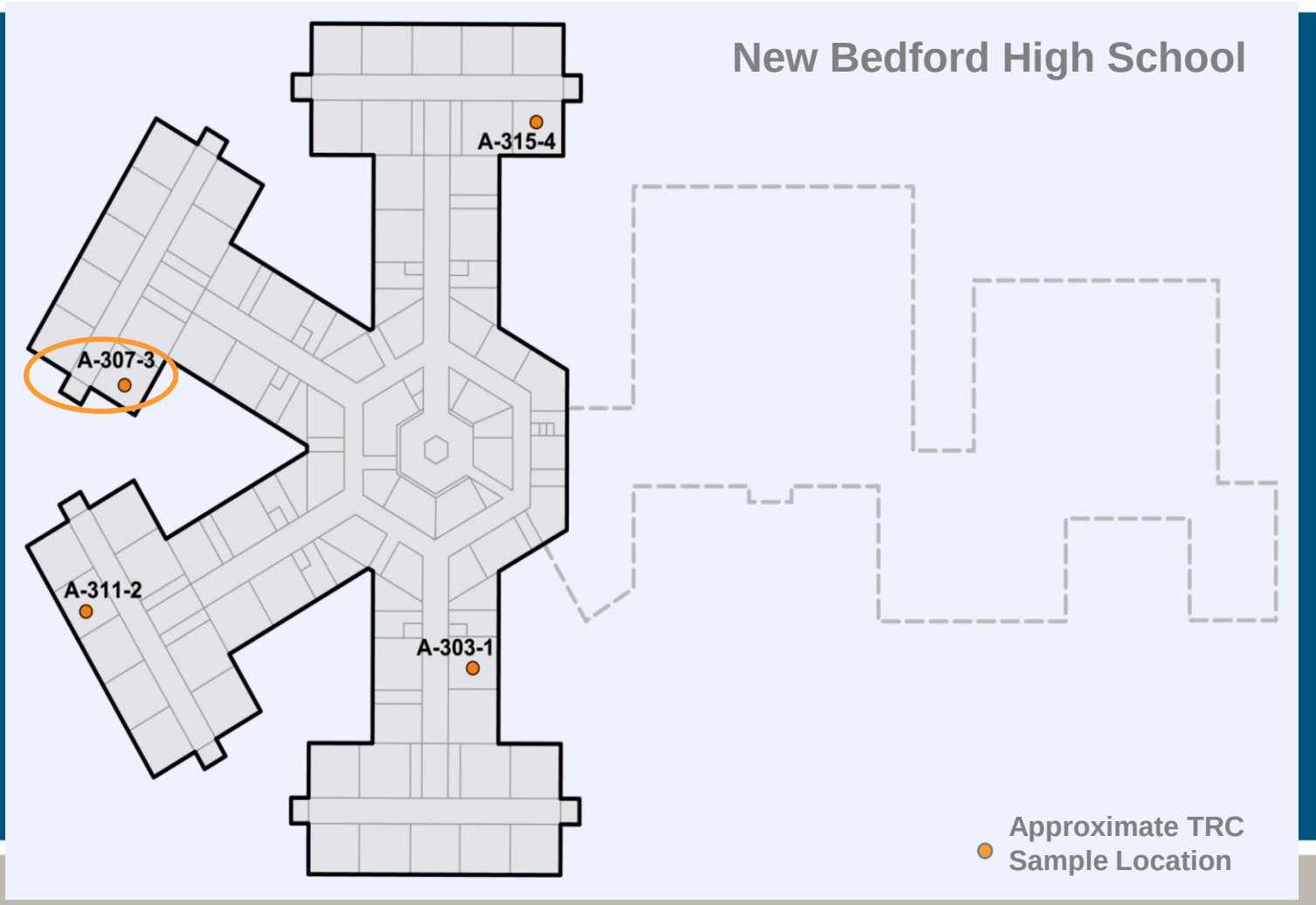
Second Floor Air Sampling Locations

February 2008



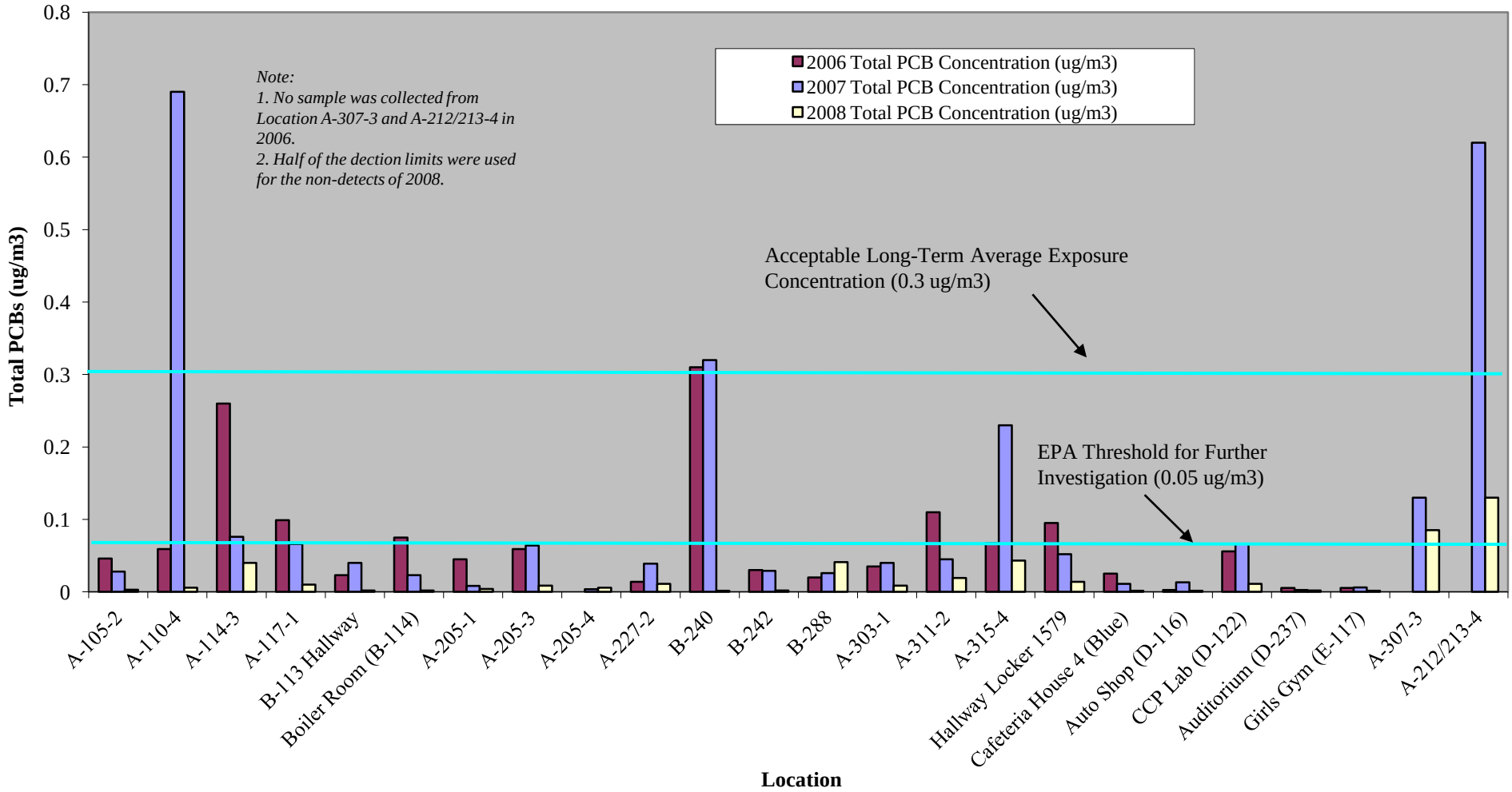
Third Floor Air Sampling Locations

February 2008

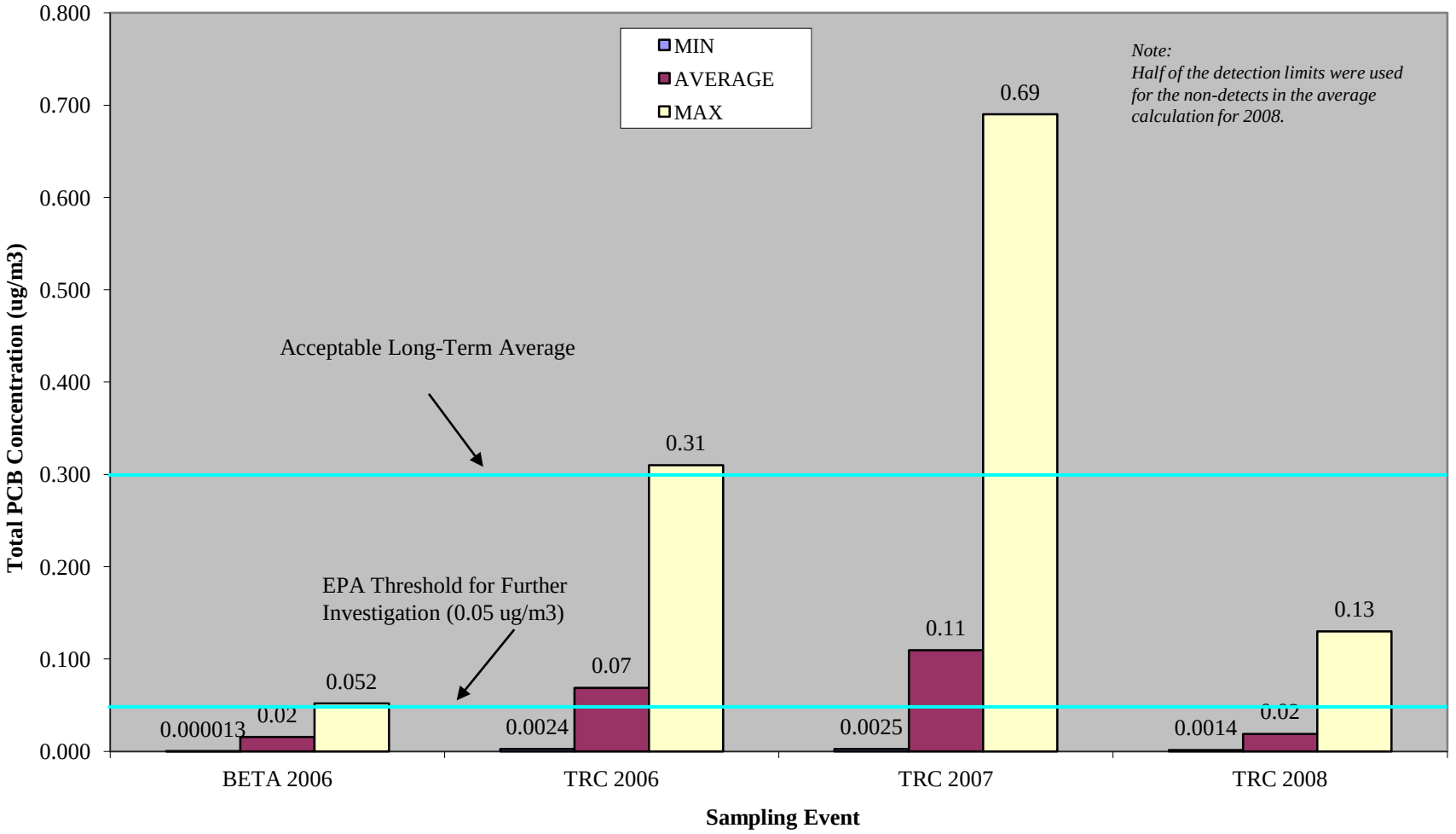


Comparison of TRC NBHS Indoor Air Results

August 2006, August 2007, and February 2008



NBHS Indoor Air Results - Min, Max, and Average (ug/m3)
2006, 2007, and 2008



PCB Indoor Air Monitoring Results for NBHS

February 2008

- Concentration Range:
  - ND, 0.0014 ug/m^3 to 0.13 ug/m^3
- Locations Above *Threshold for Further Investigation* (0.05 ug/m^3): 2
  - Room A-307-3 0.085 ug/m^3
  - Room A-212/213-4 0.13 ug/m^3
- Locations Above *Acceptable Long-Term Average Exposure Concentration* (0.3 ug/m^3)
  - *None*
- *Eight interior non-detect results!*

Working Hypotheses

Elevated PCB Air Levels

- Other PCB Source Contributions
  - Numerous low concentration sources
  - Preliminary bulk/air correlation
    - B-240 vs. A-114-3
- Inadequate Ventilation During Testing
  - Old, malfunctioning exhaust/unit vents

Possible Correlation

2007 Bulk and Air Results

Medium	B-240	A-114-3	High Conc. Correlation
Floor Tile Mastic	10.1 ppm	0.2 ppm	B-240
Window Glazing	14.9 ppm	2.1 ppm	B-240
Baseboard Mastic	4.5 ppm	2.0 ppm	B-240
Old Paint	0.2 ppm	8.3 ppm	
Recent Paint	2.9 ppm	1.6 ppm	B-240
Steel Beam Paint	6.4 ppm	4.3 ppm	B-240
Air Result 2007	0.32 ug/m^3	0.08 ug/m^3	B-240

Concentration Units: Bulk results in mg/Kg (ppm), Air Results in ug/m3

NBHS Interior

Path Forward – Characterization and Planning

- Characterize and map PCB sources
  - Proposed plan submitted to City
  - Anticipate EPA wanting further sampling regardless of Feb. 2008 results
- Formulate Additional Remedy
  - Based on PCB source mapping and other input (EPA)
- Provide regular updates to school and public

NBHS Interior

Path Forward - Remediation

- Source Removal
- Manage in place
- Encapsulation

Encapsulation

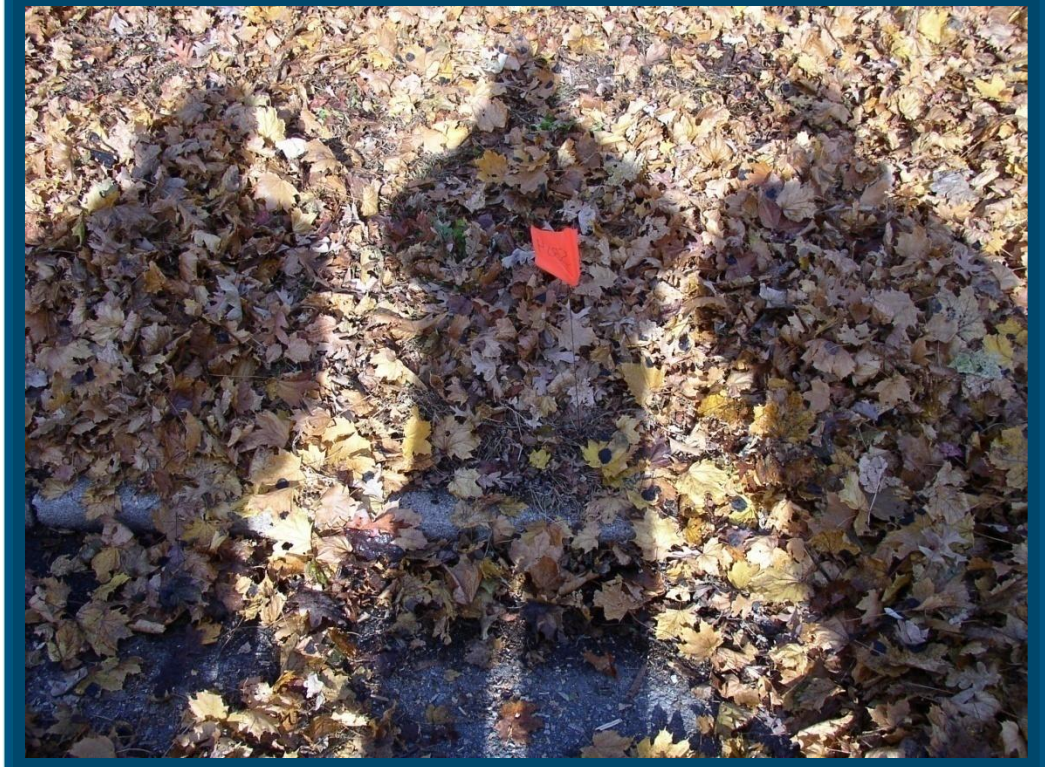
- Encapsulation uses impermeable epoxy paints, sealants, coatings
  - Innovative application for PCBs
  - Not EPA approved or tested

- *Will require pre and post flux chamber evaluations and other testing to demonstrate effectiveness to EPA*

Manage in Place

- Operations and maintenance of building materials
  - Maintenance of air handling systems, routine cleaning, lubricating
  - Periodic inspection of confirmed building materials, flaking paint
  - Remove when convenient during renovation (like asbestos)
- Program of regular air monitoring
- Teacher/parent buy-in
- Staff training

TRC Soil Investigation



- Initiated Fall/Winter 2007
- Additional Work in March 2008
- Back On-Site May 2008

Investigation Quantities Comparison

	BETA Residential	BETA Walsh Field	TRC Residential
PCBs	325	69	257
PCB Homologs	0	0	26
PAHs	87	50	195
Metals	94	52	205
VOCs	45	0	4
VPH	0	0	2

- Previous Sampling
  - BETA - Residential Grid
  - BETA - Walsh Field
  - TRC - 94 soil boring residential survey to date
- Analyses
  - PCBs (Aroclors/Homologs)
  - VOCs, PAHs, Metals, VPH
  - DBF, TPH (BETA)

AMS Model 9100

New England Geotech

- Track Mounted Geoprobe Rig
- Compact (34 Inches Wide)
- Access Tight Spaces/Bldg. Interiors
- Propane Fuel
- Low Impact

Model 6620DT

New England Geotech

- Track Mounted Geoprobe Rig
- Suitable for Rugged Terrain
- Plywood reduces impacts to lawns or other surfaces

Model 540 M Dolly Rig

New England Geotech

- Ideal for accessing tight areas where track rigs cannot manuever
- Due to steep slopes and narrow openings, TRC has used this rig at several properties in New Bedford

Geoprobe Holes

New England Geotech

- Two-Inch diameter hole
- Backfilled with remaining samples materials
- Compacted
- Top off with clean sand and similar surface material

NBHS/Area Time Line

- ❑ Data Collection & Remedial Planning 2008
- ❑ Prepare for/Initiate Public Bidding 2008/2009
- ❑ Initiate Targeted Remedies 2009 (sooner if possible)

NBHS/Area Investigation

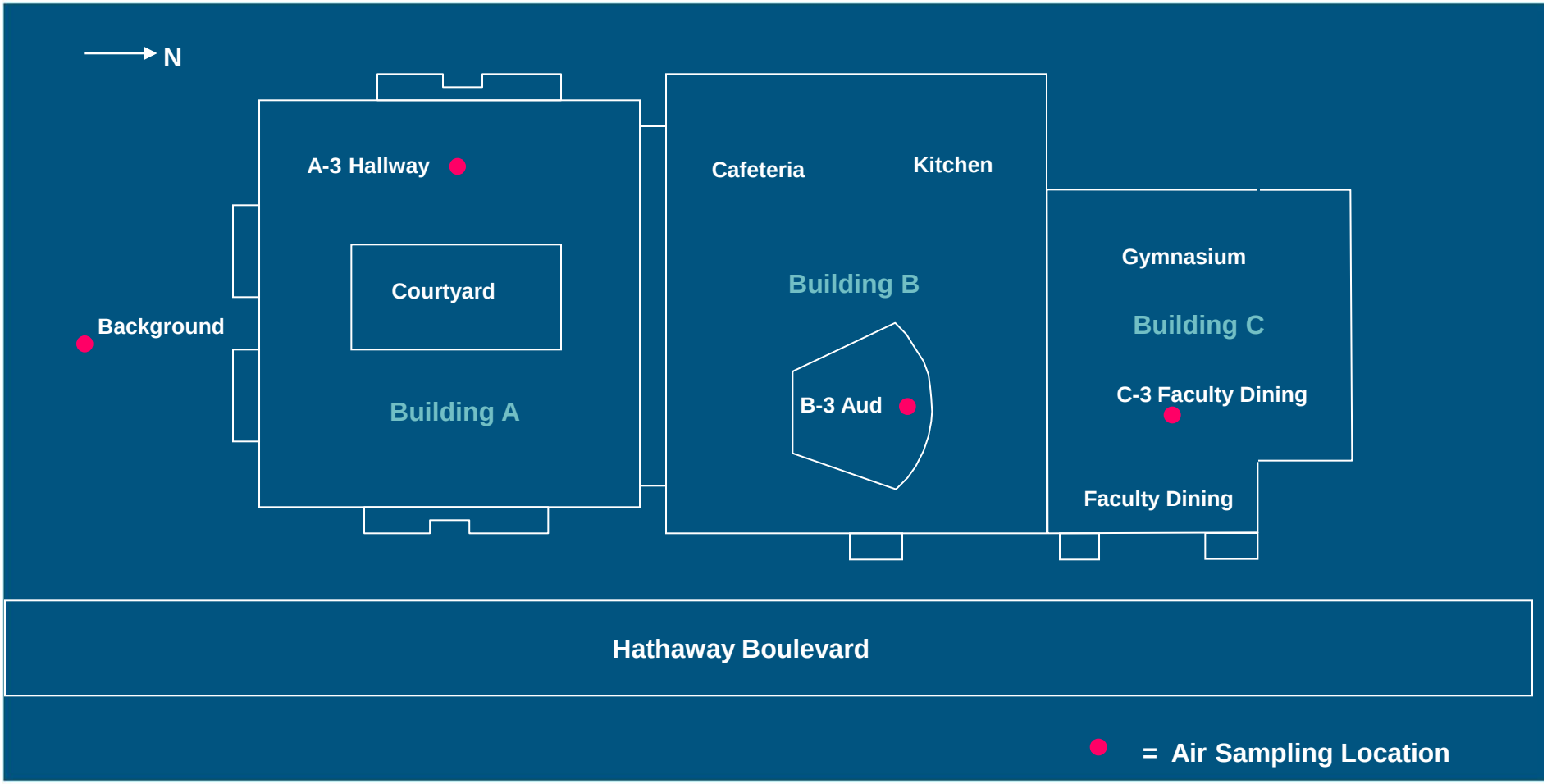
Anticipated Remedial Elements/Options

- ❑ Material removal
- ❑ Clean soil cover
- ❑ Excavation and consolidation with clean cover
- ❑ Activity and use limitations (AULs)

Keith Middle School Monitoring Update

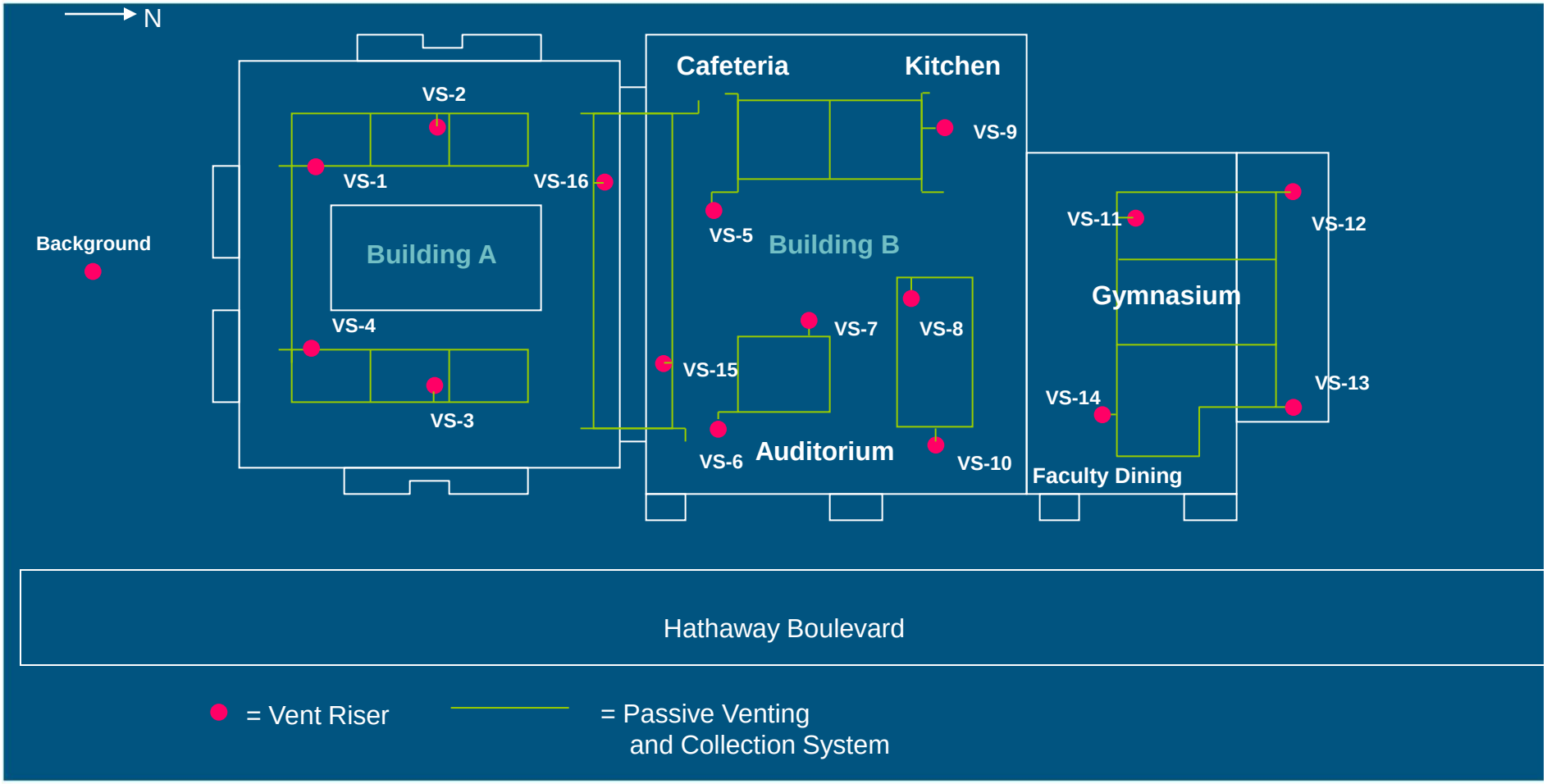
- TRC Monitoring since March 2007
- PCBs – Indoor Air/Vents
- VOCs – Indoor Air/Vents

KMS Indoor Air Sampling - Locations

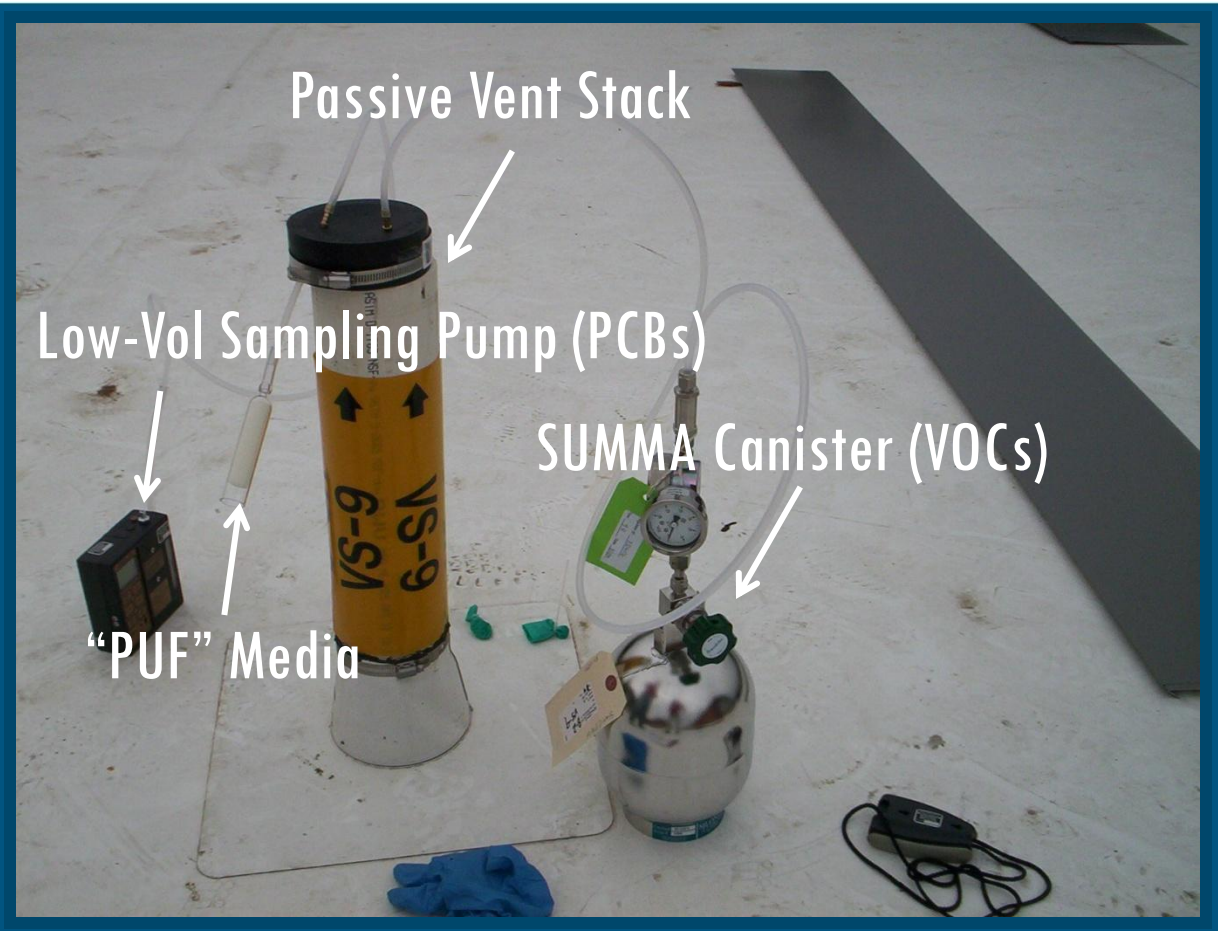


Background Sampling In Progress

Foundation Vent Stack Sampling Locations

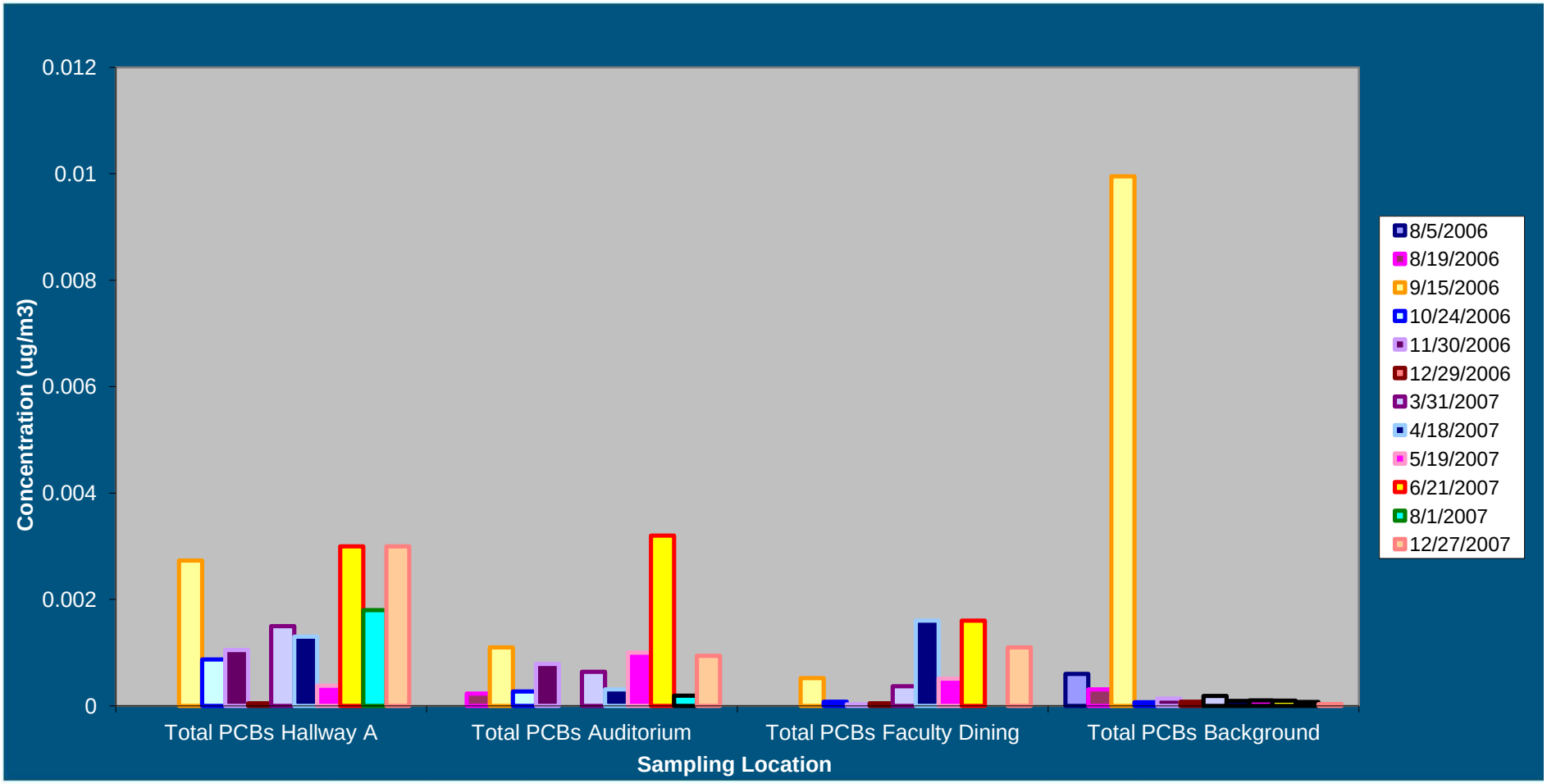


Vent Sampling In Progress

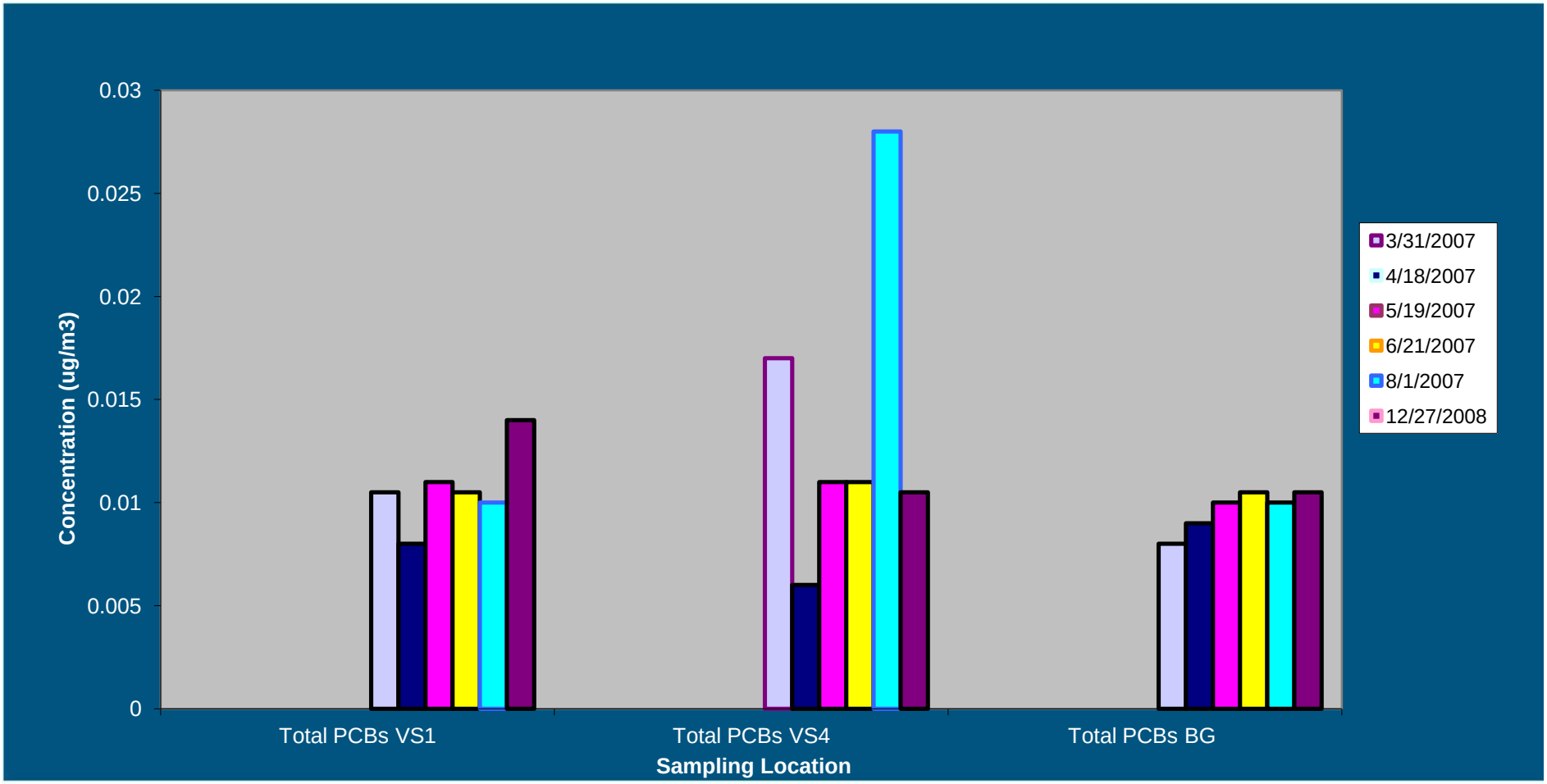


Total PCBs in Indoor Air Trends

August 2006 - December 2007



Vent Stack - PCBs Trends
March 2007 - December 2007



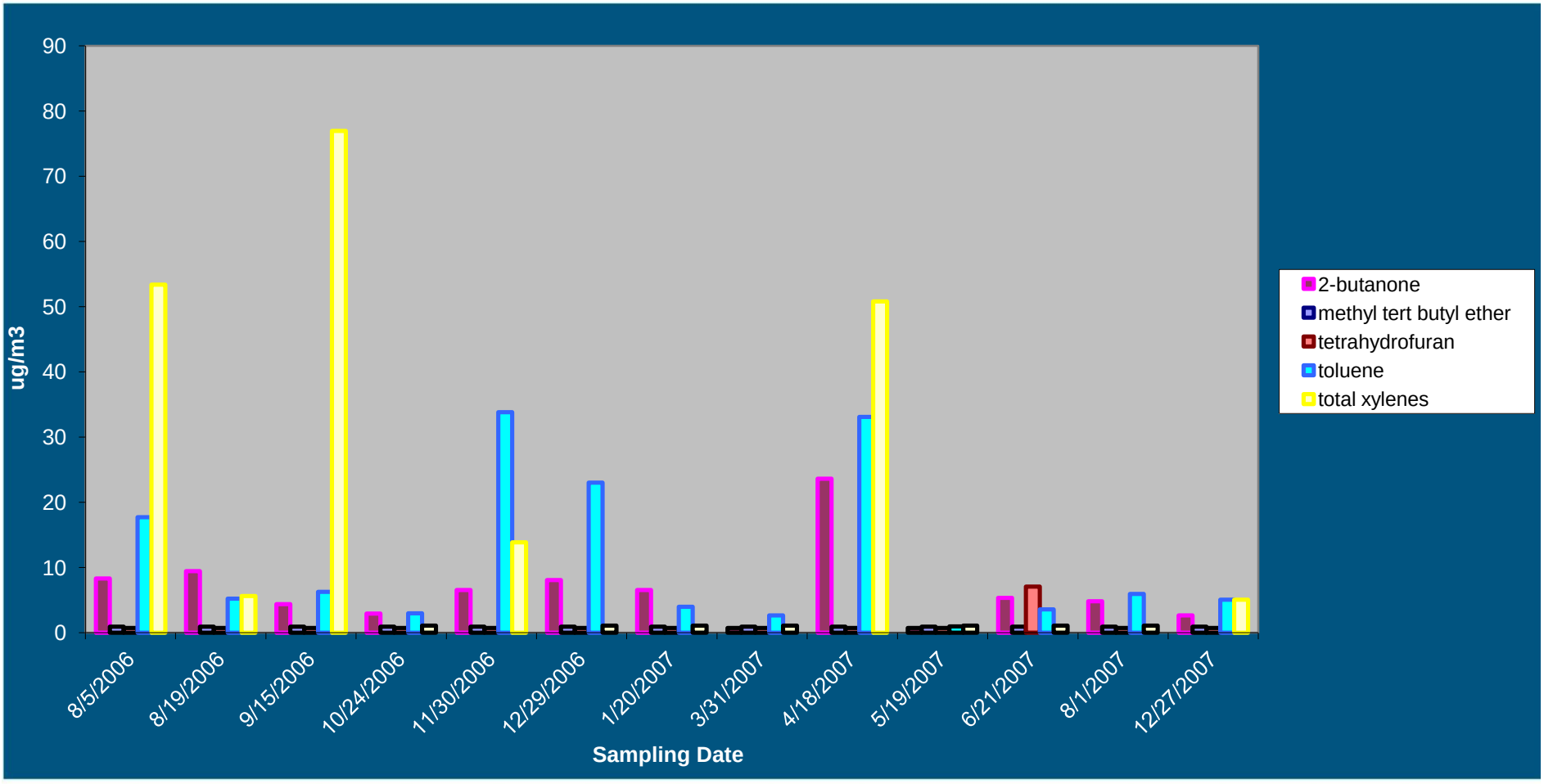
KMS Air Monitoring

PCBs

- PCBs KMS indoor air equivalent or < background air
- PCBs well below EPA Action Level (0.050 ug/m3)
- PCBs Present in Vent Samples Periodically (Background)

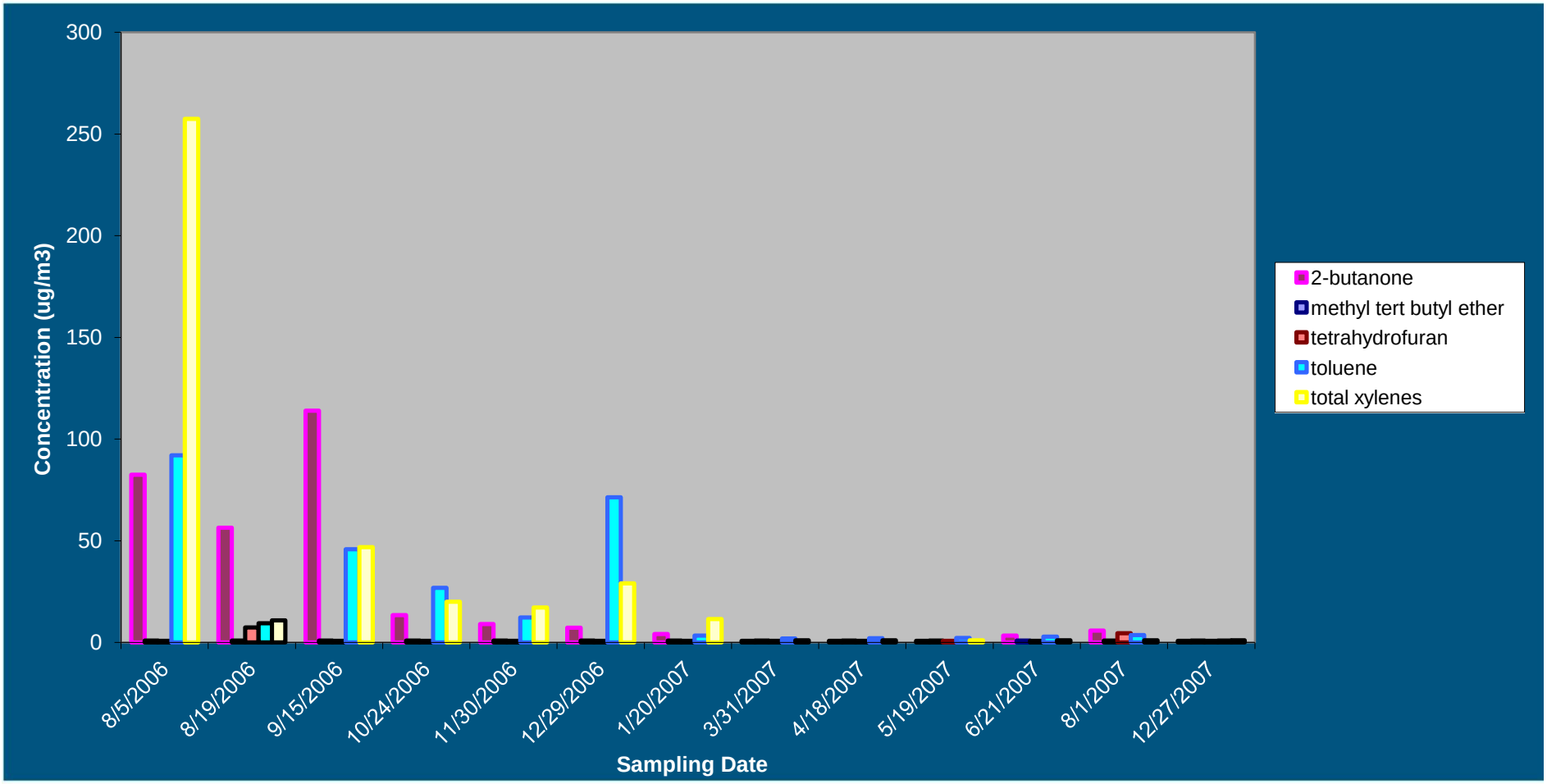
VOCs in Building A Indoor Air Trends

August 2006 – December 2007



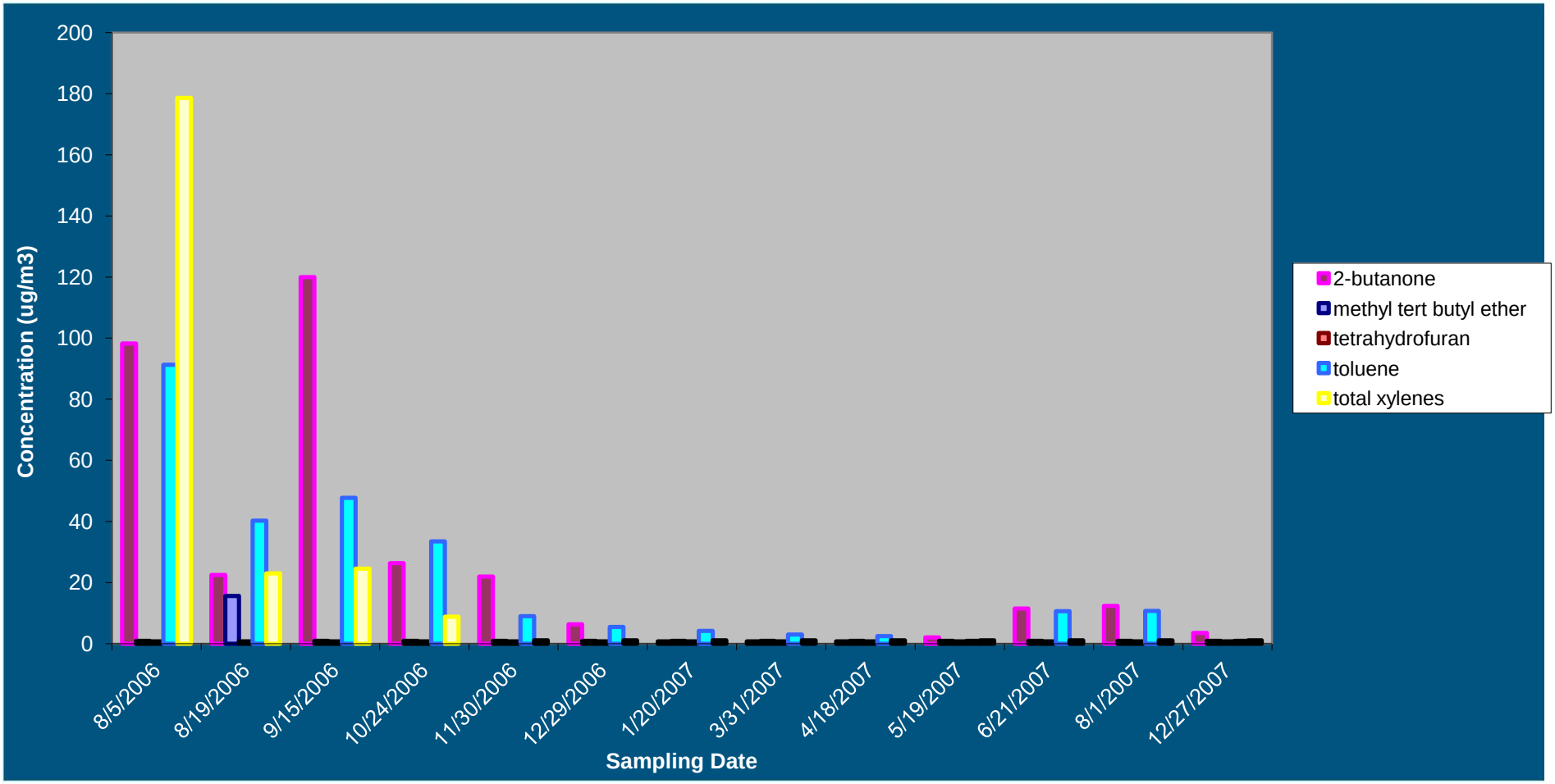
VOCs in Building B Indoor Air Trends

August 2006 – December 2007



VOCs in Building C Indoor Air Trends

August 2006 – December 2007



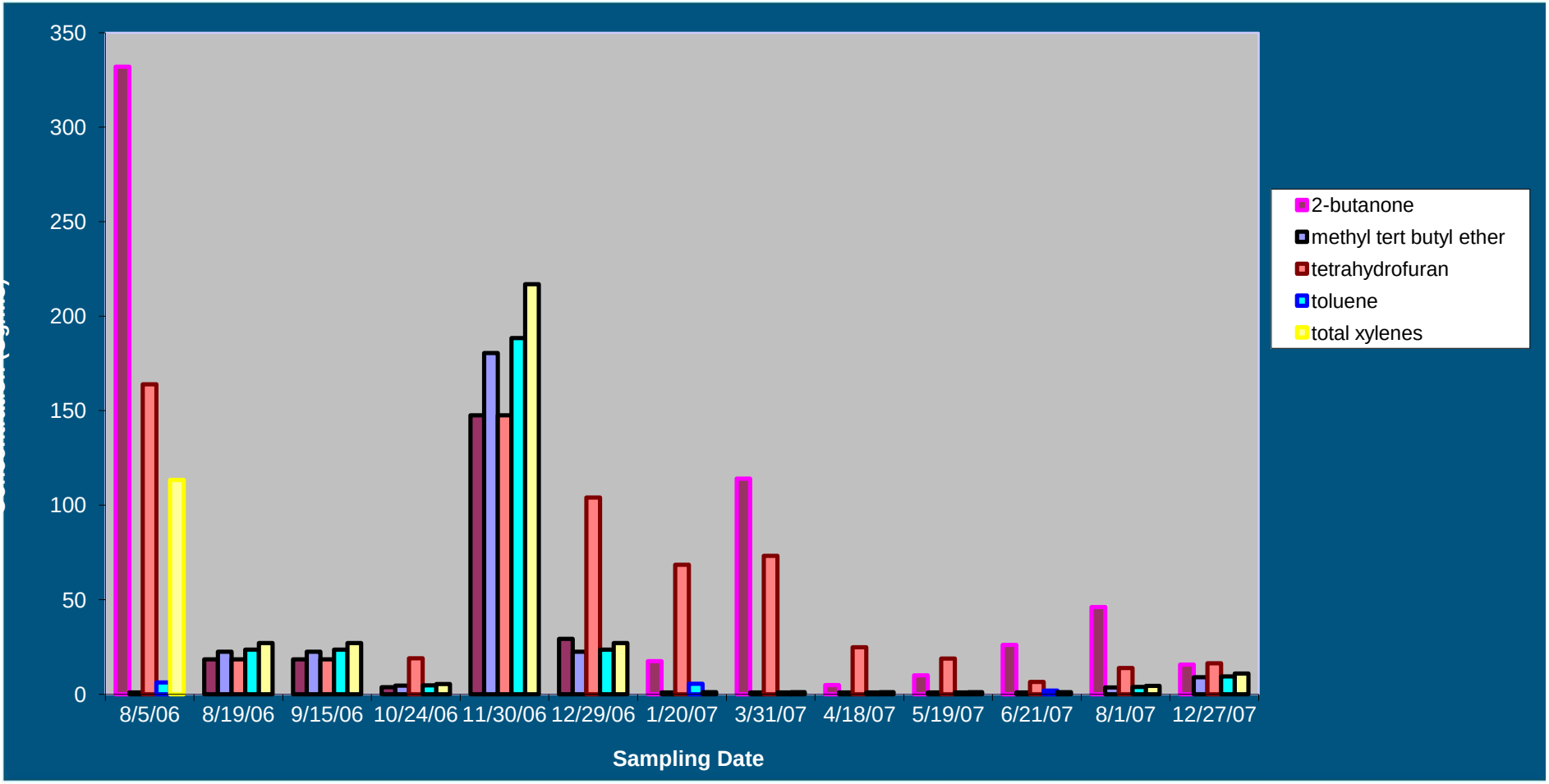
Risk Evaluation for Indoor Air
Keith Middle School

- Some compounds detected above AAL/TELs*
- AAL/TELs are outdated
- Risk evaluation shows no risk above MassDEP criteria
- TRC to recommend updated comparison criteria based on more current toxicology

*AAL-Allowable Ambient Limit
TEL – Threshold Effect Exposure Limit

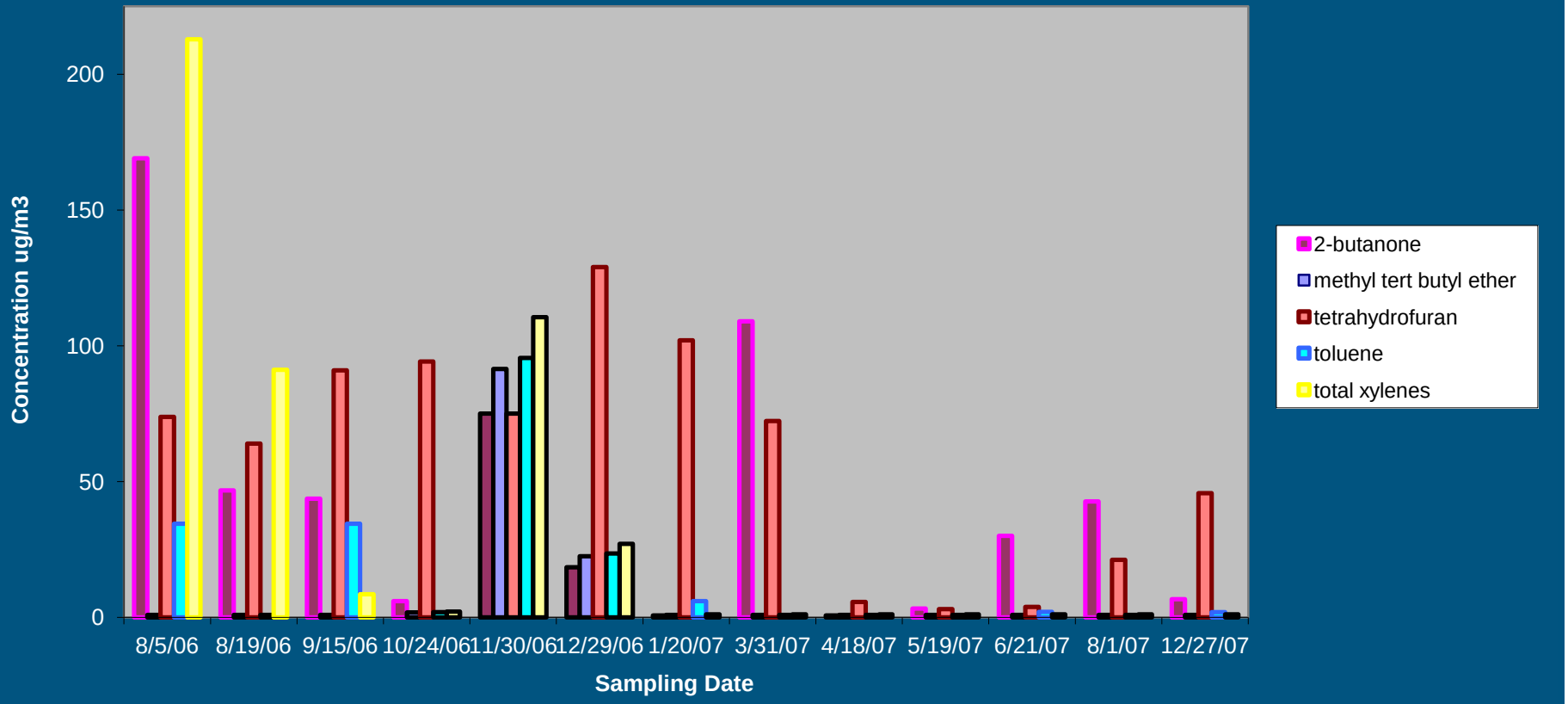
VOC Vent Stack Trends (VS-1)

August 2006 – December 2007



VOC Vent Stack Trends (VS-4)

August 2006 – December 2007



VOC Measurements Summary of Findings

Keith Middle School

- VOCs Present in Vents Consistently
- VOCs in Vents
  - Generally decreasing in concentration over time
  - Also reflects compounds in soil gas (indicates system performing as designed)
- VOCs KMS Indoor Air
  - Background concentrations (off-gassing of building materials)
  - Also attributable to maintenance activities

TRC Investigation Remediation Status
New Bedford High School Vent Remediation
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Questions are Welcome!